SPHINGIDAE OF THE CÉVENNES

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INTRODUCTION

Nineteen species of hawk-moth (Sphingidae) are recorded from the Cévennes (Central Massif). Most are recorded from the southern part, the Basse-Cévennes, particularly in the region of St Martial and the hamlet of Cabanevieille. The geology of the southern region comprises limestone pavement, granite, conglomerate and micaschist rising to 1567 m on Mt Aigoual. It lies within the *Parc National des Cévennes*. Most of the following observations have been made over the last 15 years.

FAMILY: SPHINGIDAE

SUBFAMILY: SPHINGINAE

1. *Agrius convolvuli* (Linnaeus, 1758)

Convolvulus hawk-moth; le sphinx du liseron, le sphinx à cornes de boeuf.

The species was numerous at light traps in August 1977, infrequent at same time in 1978 and never seen since. Professor H. Harant recalls that on the coast (about 50 km from the Cévennes) the adult frequents the strongly aromatic flowers of sea daffodil (*Pancratium maritimum*). In the Cévennes one of us (P.D.) has seen this crepuscular moth feeding at petunias in the evening during the end of August and beginning of September. Jacques Lhonoré has observed hundreds of full fed larvae swarming on sea bindweed (*Convolvulus soldanella*) on the dunes at Grau du Roi (some way from the Cévennes). This was about 15th September 1971. Larvae collected here, pupated on about the 22nd September and hatched on 3–5th October. There were no parasites. This provides some evidence that there are at least two generations of this moth in the region.

When disturbed the full-fed larvae stays still and curls up showing off its 'horn' and rear segments (Fig. 1). The effect is striking mimicry of a vertebrate face, possibly that of a snake.

2. *Acherontia atropos* (Linnaeus, 1758)

Deaths-head hawk-moth; le sphinx à tête de mort.

Known to us from only a handful of specimens to light, (e.g. 2nd September 1978) and twice since, according to local farmers the large larvae of this species used to be a familiar sight in potato fields at harvest time. However, extensive use of rotary cultivators and insecticides has probably been partially responsible for their decline. There have been few recent records of this magnificent moth: one larva was seen on the 28th August 1987; two pupae were found 10 cm deep in a potato field, during manual harvesting at the end of July 1987, and one adult hatched on the 5th August of that year.

The moth is associated with the honeybee; it has a short proboscis for penetrating honey cells and mimics the sound of queen bees' piping. Bee-keeping is a traditional industry in the Cévennes and there are hundreds of tree trunk hives as well as modern hives likely to sustain this requirement of the moth (see various articles in the *Revue du Parc National des Cévennes*).

Fig. 1. Larva of *Agrius convolvuli* curled up and showing off its 'horn'.

3. *Sphinx ligustri* Linnaeus, 1758

Privet hawk moth; le sphinx du troène.

Known from only two specimens; one at Sumene during August 1986, the other at Cabanevieille in 1987. Privet (*Ligustrum*) is mostly restricted to residential areas in the Cévennes and one would expect this moth in urban areas. A record of this moth in Le Vigan by M. Warnotte in 1977 confirms this.

4. *Marumba quercus* Denis & Schiffermüller, 1775

Oak hawk-moth; le sphinx du chêne.

Known from only three specimens; the first recorded by M. Warnotte at Le Vigan in 1977, the second by J.F. as a dead specimen found on 17th June 1987 at the roadside at the tiny village of Pegairolles-de-Bueges (just outside the Cévennes to the south in Herault). The area is at 397 m in fairly undisturbed holm oak (*Quercus ilex*) shrubby countryside, which, of course is typical habitat for this species. The third specimen arrived, surprisingly, at 02.30 hours on the morning of 11th June 1988 (P.D.) — a rare occurrence since it has never before been recorded at light here. This is the only *Marumba* species known in Southern Europe.

5. *Sphinx pinastri* (Linnaeus, 1758)

Pine hawk-moth; le sphinx du pin.

Known from only two specimens; one at Cabanevieille in 1983 by P.D., the other at Le Vigan by M. Warnotte in 1977.

6. *Mimas tiliae* (Linnaeus, 1758)

Lime hawk-moth; le sphinx du tilleul.

The lime hawk is widespread and common in the Cévennes, where it is a frequent

visitor to the m.v. light during early August. The earliest record of a moth was on the 5th April 1988, when one was seen drying its wings, some 20 metres from a lime (*Tilia* × *europaea*). This early record suggests that there are at least two generations of the lime hawk-moth, and perhaps three at lower altitudes (e.g. Sumene, Ganges, Le Vigan). The larvae probably also eat the leaves of alder (*Alnus glutinosa*) and nettle tree (*Celtis australis*) which are commoner than lime trees, but we have not seen any larvae on them.

The attractive silver lime (*Tilia tomentosa*) is a frequent shade tree used as avenues in towns and villages. It is doubtful that larvae feed on the leaves of this species as the plant probably does not have the necessary nutrients for active larval growth, or it has poisonous secondary plant substances. The light coloured leaves are due to a lack of chlorophyll and magnesium. The Cevenol people do not make tisanes from the flowers of the silver lime, as it is said to contain distasteful properties.

7. *Laothoe populi* (Linnaeus, 1758)

Poplar hawk-moth; le sphinx du peuplier.

Probably widespread, but apparently rare, it has been recorded at light during its second generation on the 17th and 22nd August 1978 and once again during 1983 by P.D. It probably has two generations, one in May, the other in the second half of August. The polymorphic form *rose* has never been recorded. Lhomme records the larvae eating *Paulownia, Catalpa* and *Spiraea* which are now increasingly found as ornamental species in town and village gardens.

Subfamily: Macroglossinae

8. *Hemaris tityus* (Linnaeus, 1758)

Narrow-bordered bee hawk-moth; le sphinx gazé; le sphinx bombyliforme.

The larva has been photographed in June feeding on *Galium* at Monoblet to the south east of the Cévennes. Its broad pink bars are highly characteristic. Jacques Lhonoré has recorded this species as more abundant during the first generation at the end of May, than the second. Specimens are sometimes seen at the end of April. Patrick Ducros has seen the moth flying in the Vallée du Bonheur at Camprieu on 11th July 1988. One fine specimen was seen at Sannisac (near Sumene) on 28th August 1983 nectar-feeding on scabious (*Knautia* sp.).

9. *Hemaris fuciformis* (Linnaeus, 1758)

Broad-bordered bee hawk-moth; le sphinx gazé, le sphinx fuciforme.

An infrequent moth whose larvae are said to feed on *Scabiosa* and *Knautia*. Like the previous species it is, according to Jacques Lhonoré, more abundant during the first generation. Several adults were seen by one of us (J.F.) near Alzon (800 m) on 21st June 1988 feeding repeatedly at viper's bugloss (*Echium vulgare*). In the Bouches de Rhone (Provence) 100 km away from the Cévennes, Hanson noted that this moth was very local.

10. *Macroglossum stellatarum* (Linnaeus, 1758)

Humming-bird hawk-moth; le moro-sphinx, le sphinx du caille-lait.

An abundant diurnal moth of the Cévennes. It is also crepuscular and flies on warm evenings after sunset and early in the morning. Larvae have been recorded (by J.L.) feeding on cleavers (*Galium aparine*) in La Vallée de la Jonte, near Le Rozier, on 8th May 1985.

Flower-feeding is its speciality. It seems to have a preference for purple-coloured

flowers though this is not that clear cut. For instance, in August 1983 we recorded it feeding at the following purple flowers: mallow (*Malva* spp.), thistles (*Cirsium* spp.), buddleia (*Buddleja* sp.) and aubergine (*Solanum melongena*) even as late as 21.00 hours. It also went to red–purple valerian (*Valeriana officinalis*), red willowherbs (*Epilobium* spp.) soapwort (*Saponaria officinalis*) and marjoram (*Origanum vulgare*). But it was also recorded at the white flowers of basil (*Ocimon sp.*), calamint (*Calaminta* spp.) and blue hydrangea (*Hydrangea*) as well as the white and pink flowers of bramble (*Rubus* spp.). Jacques Lhonoré has observed the species often feeding on viper's bugloss — the viperine — (*Echium vulgare*).

The humming-bird hawk-moth is an extremely active feeder coming back frequently to the same flower or doing a round of flowers, then darting off at high speed. Periods of flower-feeding are often followed by periods of quiescence. It spends much time searching for a place to rest, usually on the vertical face of a stone wall. But it does not spend much time here and it is soon off again seeking nectar.

The moth hibernates in the dry stone walls of which the Cévennes has thousands of miles on the terraced hillsides, in corners of windows in houses and in factories. Moths are on the wing from the beginning of March when they reappear from hibernation. From then on there are probably two or three generations since the moths may be seen continuously until November. In the warmer lowlands of Provence, Hanson (1946) noted it as on the wing 'all year'. It comes to light too.

Miriam Rothschild (1980) notes that the humming-bird moth is a very palatable species. This is presumably why it is has cryptic coloration and flies fast and in a darting manner, to avoid predators. At night it is said to be eaten by bats. In the Cévennes bats are, fortunately, still very common and most houses have them in roofs, granaries, outhouses and cellars.

11. *Proserpinus proserpina* Pallas, 1772

Willowherb moth; le pterogon, le sphinx de l'epilobe, le sphinx de l'oenothere.

We know this moth from only one specimen — a caterpillar collected during Easter 1982 at Cabanevieille subsequently gave rise to a crippled adult in May–June 1983. This species is noted as a rare moth in central and southern Europe. The larvae feed on evening primrose (*Oenothera* spp.) (Stanek, 1977) and willowherb (*Epilobium rosemarinfolium*). It is typically a species of limestone regions.

12. *Hyles euphorbiae* (Linnaeus, 1758)

Spurge hawk-moth; le sphinx de l'euphorbe.

This is one of the commonest hawk-moths of the Cévennes, and a pretty one, which may be seen at dusk along roadside verges and on the *garrigue* hovering beside flowers and sipping nectar. This latter behaviour we have only observed in September, presumably for adults of the second, or third generation. Such crepuscular behaviour has never been seen in July and August.

The aposematic larvae are often very common on spurges, most frequently on the tall and impressive *Euphorbia characias* their red, black and white warning colours defying predators. In the spring, larvae are often seen on the cypress spurge (*E. cyparissias*), whilst later in June they have been observed on wood spurge (*E. amygdaloides*.).

Freshly emerged larvae are often seen as groups on spurge leaves, but as they become larger they disperse. When one finds one large larva, other single larvae are frequently found nearby. The bright warning colours of the fully fed larva permit it to feed on its foodplant in the face of potential predators such as lizards especially the green lizard (*Lacerta viridis*) and the common wall lizard (*Podarcis muralis*).

No doubt the poisonous alkaloids of the food plant are stored in the larval skin as chemical defence. In 1922 Lhomme recorded plenty of larvae at La Molene along the Tarn in the North of the Cévennes during July. Larvae have been found by J.F. in July and again in September and adults are frequent visitors to light in August.

13. *Hyles nicaea* (de Prunner) 1798

Le Sphinx nicea.

This species is only known to us from two specimens we caught on 14th July 1984 at Cabanevieille. It is very similar in colour and pattern to the spurge hawk-moth, but it is very much larger. One specimen had a wingspan of 99 mm, compared to two examples of *E. euphorbiae* at 58 mm and 77 mm. It is a fine-looking and powerful species which originates from North Africa and the Iberian Peninsula. It is likely that there is also a small resident population of this species in the warmer coastal regions of the Gulf du Lion.

The moth is cited from the following Cévennes localities by Lhomme; Ales, Le Vigan, Anduze and Uzes. Larvae feed on a variety of spurges like *E. esula, E. characias*, and *E. nicaenois*.

14. *Hyles gallii* (Rottemburg, 1775)

Bedstraw hawk-moth, le sphinx de la garance.

Known only from one larva photographed in June 1986, the adults had never been recorded at light. It is said to feed on *Rubia tinctorum, Galium verna* and *Epilobium* spp., all of which are common in the Cévennes. Jacques Lhonoré notes that the larvae much prefer *Rubia peregrina* and *R. tinctorum* than *Epilobium* spp.

15. *Hyles livornica livornica* (Esper, 1780)

Striped hawk-moth; le livournien, le sphinx orangé.

Known from only three specimens, all to light; the first on 19th August 1977 at Cabanevielle, the others at Sannisac (1980) and at Cabanevieille. A strong migrant from Africa, this species hardly ever penetrates the mountainous Cévennes. It is noted as being very common in certain years in the Midi of France (which is a warmer area to the south-east) and may be seen either in May–June or August—September (Harant & Jary, 1983). The French name for the moth is taken from the region of Italy called Livourne.

16. *Hyles vespertilio* Esper, 1779

Mouse hawk-moth; le sphinx chauve-souris, le cendré, le sphinx vespertilio.

Known only from only two specimens to light on 14th July, 1979 and 14th July 1984, both at Cabanevieille. The species is probably under-recorded since it is very similar in size, colour and pattern to the spurge hawk-moth.

17. *Deilephila elpenor* (Linnaeus, 1758)

Elephant hawk-moth; le grand sphinx de la vigne.

This is not a common moth in the Cévennes. It has been recorded only as two specimens, both at light, the first on 22nd August 1978, the second in 1985; both at Cabanevieille. Surprisingly it is not often encountered as larvae in the vineyards, but transparencies of a larva eating grape leaves have been made during June. Persistent use of insecticides and copper sulphate in the cevenol vineyards has probably dramatically reduced the numbers of this species. Larvae also feed on *Epilobium, Fuchsia* and *Galium*.

When molested by predators the fully-fed larva puffs up its anterior end when

disturbed showing off vertebrate-like false eyes. This is interpreted by Miriam Rothschild (1980) as mimicking a small snake. In the Cévennes there are always numerous Grass snakes (*Natrix natrix*) and rarely there are Montpellier snakes (*Malpolon monspessulanus*) (one small dead one, 12 cm long, has been brought in by the cat).

18. *Deilephila porcellus* (Linnaeus, 1758)

Small elephant hawk-moth; le petit sphinx de la vigne, le petit pourceau.

This is common in comparison to the previous species. Sometimes during June to August there may be two or three resting on the white sheet illuminated by the moth light every night. It is on the wing until September. The species is also recorded on Mt Aigoual by M. Warnotte during 1977.

19. *Smerinthus ocellata* (Linnaeus, 1758)

Eyed hawk-moth; le sphinx demi-paon.

This species is known to us from only one specimen at Cabanevieille caught during 1985.

Discussion

Nineteen species have been recorded for the Cévennes over the last 15 years or so. Most have been recorded from the Basse-Cévennes which represents only a small part of the mountainous Cévennes. No previous records of sphingids exist at the Park headquarters in Florac. Due to the relative lack of recorders in the Cévennes, it is likely that one or two more species and new localities will be identified in the future. Tony Pittaway, author of the forthcoming book on hawk-moths of the Western Palaearctic, believes that two further species should be found in the Cévennes (they are recorded for the region in general). These are *Hyles hippophaes* and *Daphnis nerii*. *H. hippophaes* is a rather local and elusive moth confined to areas where its larval food plant, *Hippophae rhamnoides* grows. However, the food plant is not noted from the Cévennes.

A rare migrant to the Cévennes may well be the oleander hawk-moth (le sphinx du laurier-rose *Daphnis nerii* (Linnaeus, 1758)). It has been recorded in Provence by Hanson in 1946. The larvae feed on oleander (*Nerium oleander*), which with white, red and pink flower forms is a popular plant for sheltered patios and as a pot plant. It survives well in the lowlands around the Cévennes, but is subject to frost in the mountainous Cévennes, anywhere above about 300 m. It does not grow wild, and this therefore limits any breeding potential of the larva. Larvae have been recorded from small periwinkle (*Vinca minor*) which does however, occur widely in the Cévennes. The moth is recorded from only eight stations in Spain.

Nineteen species represents a very high percentage (83%) of the total of 23 species listed in France by Leraut (1980). Lhomme (1923–35) lists 22 species for France. The 'extra' species mentioned by Leraut is the Corsican subspecies of *Hyles euphorbiae*, now regarded as a true species, endemic as well. it also represents a very high proportion (70%) of the 27 sphingids recorded from Europe by Pittaway (1989). Biogeographical Europe in this context includes the Urals, Black Sea, Bosphorus and Caucasus.

The Basse-Cévennes contains five species more than recorded from the Dordogne (400 km to the north) by Dufay (1955). Only 21 sphingids are listed for the Iberian Peninsula by Gomez Bustillo and Fernandez Rubio (1976).

The commonest sphingids in the Basse-Cévennes are the humming-bird hawk-

moth and the spurge hawk-moth. It is perhaps surprising that so many sphingids are recorded from the Basse-Cévennes, since much of it is wild countryside dominated by *Quercus ilex, Castanea sativa* and open areas of limestone pavement. *M. quercus* is notable in being scarce, though this may be because it is shy of lights or simply under-recorded. One would expect it to be common.

It is significant that *D. elpenor* and *S. ligustri* are not common, since they often prosper in urban areas (at least in England). It is also surprising that *H. pinastri* is only recorded from two specimens since so much forestry has been creeping into the Cévennes over the last decade, both on Mt Aigoual to the south and Mt Lozère to the north. Perhaps this species will increase in the future at the expense of the other species.

At least half of the sphingids recorded are known from only a handful of specimens. Some of these can be explained because they are migrants a little off their main areas (e.g. *H. l. livornica* or *H. nicaea*). The latter species has a marked coastal distribution around the Mediterranean coast of Spain. Increased mechanization of agriculture in the Cévennes is probably responsible for the decline of *A. atropos*. Turning the soil with a hand pick has so often now been replaced by the rotivators, with dramatic consequences for the larvae and pupae.

There has been a general decline in sphingids in the Basse-Cévennes and some of this has been attributed to habitat loss (e.g. forestry), increased mechanization on farms and the use of agrochemicals. Although sphingids are not mentioned, it is perhaps worth drawing attention to the review of the declining fortunes of invertebrates as discussed by Bernardi (1986), since much of it is relevant to sphingids.

Much of the Basse-Cévennes are now encompassed in the Parc National des Cévennes (PNC) where restrictions on collecting are in effect for the 'inner' park, rather than the periphery. This list of sphingids has been passed on to the Park headquarters at Florac for their records. Conservation of any habitat relies upon first knowing which plant and animal species are there in the first place. The PNC would be happy to receive other lists on any group.

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